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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,565	03/11/2004	John H. Gordon	CER-041004	2564
55162	7590	09/12/2006	EXAMINER	
CERAMATEC, INC. 2425 SOUTH 900 WEST SALT LAKE CITY, UT 84119			HAILEY, PATRICIA L	
			ART UNIT	PAPER NUMBER
			1755	

DATE MAILED: 09/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/708,565

Applicant(s)

GORDON ET AL.

Examiner

Patricia L. Hailey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above claim(s) 18-61 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,6,8-12 and 14-17 is/are rejected.
- 7) ☒ Claim(s) 2,4,5, 7, and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 01/25/05.
- ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 20060823.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-17, drawn to a catalyst, classified in class 502, subclass 302.
  - II. Claims 18-31, drawn to a method of diffusing a catalyst, classified in class 20/, subclass 420.
  - III. Claims 32-61, drawn to a gas diffusion electrode, classified in class 204, subclass 284.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are directed to a catalyst and a method of diffusing a catalyst.

The method of diffusing the catalyst is not required in the final product catalyst. Further, the catalyst has a different utility and does not have to be diffused.

Inventions I and III are directed to a catalyst and a gas diffusion electrode. The catalyst as set forth can be used in a materially different product such as in a reformer or in an electrolytic capacitor.

Inventions II and III are directed to a method of diffusing a catalyst and a gas diffusion electrode. The method of diffusing a catalyst is not required in the gas diffusion electrode.

2. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

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3. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Examiner Bruce Bell and Mr. David Fonda on August 18, 2006, a provisional election was made *without traverse* to prosecute the invention of Group I, claims 1-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-61 are hereby withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

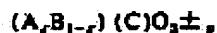
***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**6. *Claims 1, 3, 6, and 8-12, and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Tseung et al. (U. S. Patent No. 3,922,204).***

Tseung et al. disclose a catalyst exhibiting the general formula:

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and which has a perovskite structure, the cations A and B having different valency states and occupying sites in common with the closely-packed oxygen anions,  $x$  being between zero and unity but possibly equal to zero or unity, and C consisting of a transition metal cation or cations of variable valency. The cations A and B should have similar ionic radii and of course should have compatibility with the existence of the perovskite structure. The cations C will occupy the octahedral positions of the crystal lattice and the material(s) must exhibit ferro-magnetic exchange between octahedral site cations of different valency. Cations C will be of metal(s) chosen from the first row of transition elements in the Periodic Table whose Atomic Numbers are 22 to 29 inclusive), most probably cobalt or nickel, but possibly from those of the second or third rows whose Atomic Numbers are respectively 40 to 47 inclusive and 72 to 79 inclusive) which exhibit comparable d-electron characteristics. The structure is not necessarily stoichiometric but  $y$  will most probably not exceed 0.5.

See col. 1, lines 14-34 of Tseung et al.

Examples of "A" include Sr, Ba, or Ca; examples of "B" include La, or any cation of rare earth elements whose atomic numbers are 57-71 inclusive (e.g., Nd, which has an atomic number of 60). See col. 1, lines 35-38 of Tseung et al.; this disclosure is considered to read upon Applicants' variables A, A', B, and B' (elements having atomic numbers between 22 and 79 include Mn and Fe), as well as Applicants' ranges for the variables "x", "y", "z", and "δ".

Patentees' catalyst are disclosed as applicable to electrochemical processes such as oxygen/air electrocatalysis. See col. 4, lines 24-48 of Tseung et al.

The limitation "having a greater molar ratio of cations at the beta site" is considered inherently encompassed by Tseung et al., in view of Applicants' claims in their present form.

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In view of these teachings, Tseung et al. anticipate claims 1, 3, and 6.

**7. Claims 1, 3, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Munakata et al. (U. S. Patent No. 6,060,420).**

Munakata et al. disclose a novel composite oxide defect perovskite structure represented by :

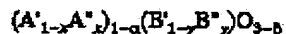


wherein A is at least one element selected from the group consisting of alkali metals, alkaline earth metals, rare earth elements, Y and Pb, and B is at least one element selected from the group consisting of Ti, Mn, Fe, Co, Ni, Cu and Al, and  $\alpha$  is  $0 < \alpha < 0.2$  and  $\delta$  is  $0 \leq \delta \leq 1$ , provided that only a known perovskite type oxide  $(La_{1-x}Sr_x)_{1-\alpha}MnO_{3-\delta}$  (when  $\alpha$  is 0.06, x is  $0.08 \leq x \leq 0.30$ , while when the value of x is 0.11,  $\alpha$  is  $0.06 < \alpha < 0.11$ ) is excluded.

In a preferred embodiment of the invention, A in the general formula is at least one element selected from the group consisting of La, Pr, Ce, Nd, Gd, Y, Ba, Sr, Ca, K and Pb.

Munakata et al. further disclose:

In another preferred embodiment of the invention, the composite oxide of A-site defect type perovskite structure is represented by the following general formula:



wherein A' is at least one element selected from the group consisting of La, Nd, Gd and Y, and A'' is at least one element selected from the group consisting of Pr, Ce, Ba, Sr, Ca, K and Pb, and B' and B'' are different and are at least one element selected from the group consisting of Mn, Co, Ti, Fe, Ni, Cu and Al, and  $0 < \alpha < 0.2$ ,  $0 \leq \delta \leq 1$ ,  $0 < x < 1$  and  $0 < y < 1$ .

In the other preferred embodiment of the invention,  $\alpha$  is  $0.1 < \alpha < 0.15$ .

See col. 3, line 51 to col. 4, line 13 of Munakata et al.

The aforementioned structures are suitable for use as catalysts. See col. 1, lines 7-10 of Munakata et al., as well as col. 3, lines 36-43.

The claim limitation "for use in the electrochemical reduction of oxygen" is considered a statement of intended use and is therefore not given patentable weight.

In view of these teachings, Munakata et al. anticipate claims 1, 3, and 6.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**11. Claims 8-12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tseung et al. (U. S. Patent No. 3,922,204).**

As stated in the above 102(b) rejection of claims 1, 3, and 6 by this reference, Tseung et al. disclose a catalyst exhibiting the general formula:

$(A_xB_{1-x})(C)O_{3\pm y}$ ,  
and which has a perovskite structure, the cations A and B having different valency states and occupying sites in common with the closely-packed oxygen anions, x being between zero and unity but possibly equal to zero or unity, and C consisting of a transition metal cation or cations of variable valency. The cations A and B should have similar ionic radii and of course should have compatibility with the existence of the perovskite structure. The cations C will occupy the octahedral positions of the crystal lattice and the material(s) must exhibit ferro-magnetic exchange between octahedralsite cations of different valency. Cations C will be of metal(s) chosen from the first row of transition elements in the Periodic Table whose Atomic Numbers are 22 to 29 inclusive), most probably cobalt or nickel, but possibly from those of the second or third rows whose Atomic Numbers are respectively 40 to 47 inclusive and 72 to 79 inclusive) which exhibit comparable d-electron characteristics. The structure is not necessarily stoichiometric but y will most probably not exceed 0.5.

See col. 1, lines 14-34 of Tseung et al.

Examples of "A" include Sr, Ba, or Ca; examples of "B" include La, or any cation of rare earth elements whose atomic numbers are 57-71 inclusive (e.g., Nd, which has an atomic number of 60). See col. 1, lines 35-38 of Tseung et al.; this disclosure is considered to read upon Applicants' variables A, A', B, and B' (elements having atomic



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numbers between 22 and 79 include Mn and Fe), as well as Applicants' ranges for the variables "x", "y", "z", and "δ".

Patentees' catalyst are disclosed as applicable to electrochemical processes such as oxygen/air electrocatalysis. See col. 4, lines 24-48 of Tseung et al.

Although Tseung et al. do not explicitly disclose the formulae recited in Applicants' claims 8 and 10, the reference provides motivation to select Nd, Ca, Mn, and Fe to obtain Applicants' variables A, A', B, and B', and thereby obtain the catalyst recited in these claims. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to select Nd, Ca, Mn, and Fe, since it has been held to be within the general skill of a worker in the art to select a material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 U.S.P.Q 416.

**12. Claims 8-12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Munakata et al. (U. S. Patent No. 6,060,420).**

As stated in the above 102(b) rejection of claims 1, 3, and 6 by this reference, Munakata et al. disclose a novel composite oxide defect perovskite structure represented by :

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wherein A is at least one element selected from the group consisting of alkali metals, alkaline earth metals, rare earth elements, Y and Pb, and B is at least one element selected from the group consisting of Ti, Mn, Fe, Co, Ni, Cu and Al, and  $\alpha$  is  $0 < \alpha < 0.2$  and  $\delta$  is  $0 \leq \delta \leq 1$ , provided that only a known perovskite type oxide  $(La_{1-x}Sr_x)_{1-\alpha}MnO_{3-\delta}$  (when  $\alpha$  is 0.06,  $x$  is  $0.08 \leq x \leq 0.30$ , while when the value of  $x$  is 0.11,  $\alpha$  is  $0.06 < \alpha < 0.11$ ) is excluded.

In a preferred embodiment of the invention, A in the general formula is at least one element selected from the group consisting of La, Pr, Ce, Nd, Gd, Y, Ba, Sr, Ca, K and Pb.

Munakata et al. further disclose:

In another preferred embodiment of the invention, the composite oxide of A-site defect type perovskite structure is represented by the following general formula:



wherein A' is at least one element selected from the group consisting of La, Nd, Gd and Y, and A'' is at least one element selected from the group consisting of Pr, Ce, Ba, Sr, Ca, K and Pb, and B' and B'' are different and are at least one element selected from the group consisting of Mn, Co, Ti, Fe, Ni, Cu and Al, and  $0 < \alpha < 0.2$ ,  $0 \leq \delta \leq 1$ ,  $0 < x < 1$  and  $0 < y < 1$ .

In the other preferred embodiment of the invention,  $\alpha$  is  $0.1 < \alpha < 0.15$ .

See col. 3, line 51 to col. 4, line 13 of Munakata et al.

The aforementioned structures are suitable for use as catalysts. See col. 1, lines 7-10 of Munakata et al., as well as col. 3, lines 36-43.

The claim limitation "for use in the electrochemical reduction of oxygen" is considered a statement of intended use and is therefore not given patentable weight.

Although Munakata et al. do not explicitly disclose the formulae recited in Applicants' claims 8 and 10, the reference provides motivation to select Nd, Ca, Mn, and Fe to obtain Applicants' variables A, A', B, and B', and thereby obtain the catalyst

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recited in these claims. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to select Nd, Ca, Mn, and Fe, since it has been held to be within the general skill of a worker in the art to select a material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 U.S.P.Q 416.

### ***Allowable Subject Matter***

13. Claims 2, 4, 5, 7, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

Although the cited references of record disclose catalysts similar to that recited in the instant claims, neither reference meets the claim limitation wherein "z is greater than 1.0", as recited in claims 2 and 13. In the aforementioned prior art, the mole fractions corresponding to Applicants' B or B' (the mole fraction represented by the variable "z" in Applicants' claims) is 1, or less than 1. See the formulae respectively disclosed in Tseung et al. and Munakata et al.

### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

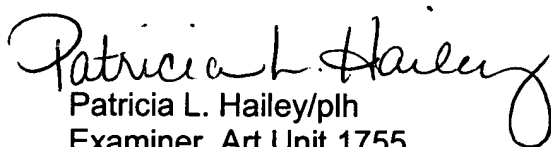
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia L. Hailey whose telephone number is (571) 272-1369. The examiner can normally be reached on Mondays-Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 1700 Receptionist, whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Patricia L. Hailey/plh  
Examiner, Art Unit 1755  
September 11, 2006

  
J.A. LORENZO  
SUPERVISOR/PATENT EXAMINER